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RESEARCH PAPER

# Psychological Well-Being Across the Perinatal Period: Life Satisfaction and Flourishing in a Longitudinal Study of Young Black and White American Women

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**Abstract**
Psychological well-being (life satisfaction and flourishing) during the perinatal period has implications for both maternal and child health. However, few studies have investigated the extent to which psychological well-being changes from *preconception* to *postpartum* periods, particularly among diverse samples of women. Using prospectively collected data from an ongoing longitudinal study, we investigated changes in two dimensions of psychological well-being from preconception to postpartum among 173 Black and White American women. Results showed that changes in life satisfaction (i.e., global quality of life) and flourishing (e.g., self-acceptance, sense of purpose) over the perinatal period were moderated by race. For life satisfaction, White women reported an increase from preconception to pregnancy with increased life satisfaction levels remaining stable from pregnancy to postpartum. However, Black women reported no changes in life satisfaction across these timepoints. In contrast, both Black and White women reported an increase in flourishing levels across the perinatal period, although the timing of these changes differed. Findings highlight a need for greater clinical and empirical attention to the way in which psychological well-being changes during the perinatal period to optimize health and inform strengths-based intervention targets.

**Keywords** Pregnancy · Positive psychology · Well-being · Racial disparities

## 1 Introduction

Psychological well-being during the perinatal period is a central component of health during pregnancy, with significant implications for a wide range of maternal and offspring outcomes. Although research on perinatal health has disproportionately focused on physical

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indicators of health, a growing body of evidence points to the importance of monitoring and promoting *psychological* health during this critical life stage (Alves et al., 2021; Law et al., 2021; B. L. Taylor et al., 2016). Indeed, psychological well-being during pregnancy, such as high levels of self-reported life satisfaction and a sense of 'flourishing', is associated with decreased risk for perinatal depression and anxiety (Strine et al., 2008; Wood & Joseph, 2010), decreased risk for adverse birth outcomes (Orr et al., 2012) and a reduction in risky perinatal behaviours (e.g., substance use) (Blake et al., 2007). Importantly, while pregnancy is often portrayed as and/or expected to be a happy time in a woman's life (Staneva & Wigginton, 2018), the prenatal and postpartum periods are also associated with dramatic biological changes and stressors (e.g., physical changes, morning sickness, breast tenderness, etc.) as well as changes in a women's psychosocial role (e.g., potential changes in workplace roles and family responsibilities) (Bjelica et al., 2018; Schaffir, 2016). Thus, to help inform the timing and targets for perinatal care, there is a need to better understand the ways in which psychological well-being changes during this important transitional period. Investigating factors associated with increases or decreases in psychological well-being during the perinatal period is a key step to promoting health and informing early preventative interventions during the pregnancy and postpartum periods.

### 1.1 Components of Psychological Well-Being

Two major aspects of psychological well-being are satisfaction with life and a sense of flourishing (Diener, 1984; Diener et al., 2010; Steptoe et al., 2015). Satisfaction with life is *evaluative* well-being, reflecting the extent to which an individual positively evaluates the overall quality of their life (Diener, 1984; Kahneman et al., 1999; Steptoe et al., 2015). This includes how much a woman perceives that the current conditions of her life are excellent or ideal, and how much a woman favourably assesses the quality of her life as a whole (Pavot & Diener, 2009). In contrast, eudaimonia is achieved by living life to its fullest potential, with flourishing representing the major aspects of eudaimonic well-being, including positive relationships, feelings of competence, having meaning and purpose in life, and feelings of optimism (Diener et al., 2010; Ryan & Deci, 2001).

Evaluative and eudaimonic well-being are moderately correlated in prior studies (e.g., $r = 0.58$), but factor analyses show they represent distinct constructs (Compton et al., 1996; McGregor & Little, 1998). In general, both life satisfaction and flourishing are important predictors of physical health (Krause, 2009; Siahpush et al., 2008) and mental health problems including depression and anxiety (Keyes & Simoes, 2012; Strine et al., 2008). However, some evidence also suggests that life satisfaction and flourishing may differentially predict specific health outcomes. For example flourishing is more strongly associated with overall subjective health compared with life satisfaction (Joshanloo & Jovanović, 2018). Thus, life satisfaction and flourishing may have some unique associations with health outcomes, highlighting the importance of examining both factors across the perinatal period.

### 1.2 Changes in Well-Being in the Perinatal Period

Few studies have directly investigated the extent to which psychological well-being changes during and after pregnancy. Results from a few European studies suggest that psychological well-being may increase from pregnancy to postpartum. Gebuza et al. (2014) found that satisfaction with life significantly increased from the third trimester to the

postpartum period. Dyrdal et al. (2011) reported comparable results, showing an increase in life satisfaction from pregnancy to 6 months postpartum. Further, Bassi et al. (2017) found that, among primiparous women, measures related to flourishing (e.g., self-acceptance, personal growth) increased significantly from mid-pregnancy (22–32 weeks' gestation) to 3–6 months postpartum.

However, several gaps remain in our understanding of changes in psychological well-being across the peripartum period. First, few studies have reported on psychological well-being *before* pregnancy, and so it remains unclear whether changes occur in the transition to parenthood or whether, in fact, they are a function of becoming pregnant. For example, we do not know if the increase in well-being from pregnancy to postpartum represents an elevated level of well-being after having a child, or if a women's well-being is simply lower during pregnancy and returns to similar preconception levels after giving birth. In one notable study, Dyrdal and Lucas (2013) reported that change in life satisfaction followed a quadratic pattern starting with an increase from preconception to pregnancy followed by a return to baseline early in the postpartum period. In this study, however, no measure of flourishing was included, and only a single question measured life satisfaction, raising questions about the validity of the measure. Hence, additional longitudinal studies are needed that begin in preconception and include rigorous measures of multiple types of well-being.

In addition, most existing research reflects the experiences of relatively homogenous samples that have typically comprised White and economically privileged women from European countries. Participants included in prior studies have typically had a mean age of approximately 30 years, with few studies including younger mothers. Hence, additional work is needed within younger samples, especially since pregnant women may have additional vulnerabilities that could directly impact levels of psychological well-being including elevated risk for experiencing stressful life events, financial strain or resource needs, and vulnerability to perinatal mental health problems including postpartum depression (Estrin et al., 2019; Kingston et al., 2012). Altogether, this limited focus in demographics, a longstanding problem in psychological science, has severely limited the generalizability of findings to the broader population (Henrich et al., 2010; Roberts et al., 2020).

### 1.3 Racial Disparities in Well-Being During Pregnancy

The lack of generalizability of prior findings is particularly problematic in the context of stark racial inequities in maternal health and perinatal health outcomes in the United States. Specifically, compared to pregnant White women in the U.S., Black women are at higher risk for eclampsia, pre-term birth, and pregnancy related mortality (DeSisto et al., 2018; Gold et al., 2014; Petersen et al., 2019). Further, in addition to a wide range of known disparities in perinatal physical health and health outcomes, racial inequities in mental health such as depression and anxiety during pregnancy have also repeatedly been reported (Ponting et al., 2020; Rich-Edwards et al., 2006). A number of systemically-rooted factors have been theorized to explain these disparities in health during pregnancy, including differential exposure to chronic stress, as well as structural and gendered racism, and mistreatment in prenatal care (Kramer et al., 2011; Mehra et al., 2020; J. K. Taylor, 2020; Vedam et al., 2019; Wallace et al., 2017). Studies comparing the experiences of Black and White women in the United States support this framework. For example, Black American women experience higher levels of discrimination than White women in pregnant samples (Seng et al., 2012), and Black women who experience more racial discrimination report lower levels of psychological well-being (Giurgescu et al., 2017). Further, pregnant Black women are twice as likely as pregnant White women

to experience financial and relationship stressors in addition to acute (e.g., involved in a car accident) and traumatic (e.g., death of a family member) stress (Zhao et al., 2015). Heightened levels of stress related to socioeconomic inequities in exposure may lead to lower perinatal psychological well-being among Black than White women. For example, differences in financial strain partially explained why Black women reported lower feelings of happiness related to pregnancy compared to White women (Hartnett & Brantley, 2020).

While no known studies have considered patterns of psychological well-being change across the perinatal period in Black American women, recent cross-sectional work has provided evidence that Black American women face disparities in psychological well-being during pregnancy, specifically disparities in life satisfaction. For example, Hartnett and Brantley (2020) found that among 6,163 women (34% Black American), Black American women were less happy about their pregnancies than White American women. In addition, in a cross-sectional study of 367,339 women (11% Black American), Hagstrom and Wu (2016) reported that being pregnant was positively associated with life satisfaction for White American women, but not for Black American women. Importantly, the different levels of well-being reported by White and Black women could not be explained by sociodemographic factors, including age, income, physical health, marital status, number of prior children, and education attainment suggesting a role for other explanatory factors. In contrast, while we know of no work during pregnancy, some evidence suggests that flourishing levels may not follow the same patterns as life satisfaction with respect to racial disparities. For example, Keyes (2009) suggests that individuals who identify as Black may have greater resilience, leading to *higher* levels of flourishing levels compared to individuals who identify as White.

### 1.4 Present Study

In the current study, we measured life satisfaction and flourishing before, during, and after pregnancy in a sample of young Black and White women living in an urban area of the United States. We used a within-person, longitudinal approach so that each woman served as her own 'control,' in order to examine changes in well-being over the perinatal period relative to preconception levels. In addition, we investigated whether patterns of perinatal change in well-being differed between Black American and White American women and examined the potential role of differences in life stress and perceived discrimination/unfair treatment during pregnancy. We hypothesized that, for the sample as a whole, 1) psychological well-being (i.e., life satisfaction and flourishing) would increase over the perinatal period, from preconception to postpartum; 2) changes in life satisfaction, but not flourishing, would vary by race such that White American women would report increases in life satisfaction over the perinatal period, whereas Black American women would report stable levels of life satisfaction across all three periods; and 3) the association between race and changes in well-being during the perinatal period would be partially mediated by group differences in changes in life stress and perceptions of discrimination/unfair treatment from preconception to pregnancy.

## 2 Methods

### 2.1 Sample and Procedure

The sample consisted of 173 pregnant women recruited from the Pittsburgh Girls Study, a community-based, longitudinal study that began in 1999–2000 (Keenan et al., 2010). The original sample of 2,450 girls was identified using a stratified, random household

sampling of 103,238 city households with an oversampling of low-income neighbourhoods. The girls were aged 5–8 years in assessment wave 1 and have been followed annually for the past 19 years with high retention (average 89%). The Pittsburgh Girls Study sample is racially diverse (52% Black, 41% White, 7% multiracial or other) and at the start of the study 39% of households received public assistance.

The Pittsburgh Girls Study began collecting data on psychological well-being at age 18 (wave 14); thus, Black and White American participants for the present analysis were included if they were 18 years or older at the time of preconception (T0) and had completed repeated measures of psychological well-being at T0, at pregnancy (T1), and in the postpartum period (T2). We identified 205 participants that completed a Pittsburgh Girls Study interview during both pregnancy (T1) and in the postpartum period (T2). Of these 205 identified participants, 17 were then excluded due to missing data. Hence there were 188 participants with complete data at T0, T1 and T2. Among this sample, 173 women identified as Black or White, with 131 (76%) identifying as Black (1 of whom also identified as Latinx) and 42 (24%) women as non-Hispanic White.

The 173 women included in analyses did not significantly differ from the 17 participants excluded due to missing data with regards to age at conception (t(188) = , $p = 0.74$) or race ($\chi^2$ (1) = 2.85 $p = 0.09$). However, excluded participants were more likely to be multiparous ($\chi^2(1) = 5.27$, $p = 0.02$). All study procedures were approved by the University's Institutional Review Board (IRB) and written informed consent was obtained prior to any data collection.

## 2.2 Measures

### 2.2.1 Life Satisfaction

The Satisfaction with Life Scale (SLS; Larsen et al., 1985) was administered at preconception (T0), pregnancy (T1) and postpartum (T2) to assess global life satisfaction. Five items (e.g., "In most ways my life is close to ideal") were rated on 7-point scales (1 = strongly disagree to 7 = strongly agree) and summed to form a total life satisfaction score ($\alpha = 0.884$ at T0, 0.885 at T1, and 0.881 at T2). The SLS scale has shown good convergent validity with other measures of life satisfaction and good temporal stability, while still being sensitive to changes in life satisfaction over time (Pavot & Diener, 2009). It also has shown strong internal reliability as well as discriminant validity from emotional well-being measures, such as positive/negative affect questionnaires (Pavot & Diener, 2009).

### 2.2.2 Flourishing

The Flourishing Life Scale (FLS; Diener et al., 2010) administered at T0, T1 and T2, is an 8-item questionnaire that assesses positive self-regard and functioning in several aspects of life. Participants used a 7-point scale (ranging from 1 = strongly disagree to 7 = strongly agree) to rate the degree to which they thought a phrase related to them (e.g., "I lead a purposeful and meaningful life"; "My social relationships are supportive and rewarding"). Item scores were summed to form a total flourishing score ($\alpha = 0.818$ at T0, 0.880 at T1, and 0.899 at T2). The FLS has demonstrated high reliability and convergent validity with other measure of psychological well-being (Diener et al., 2010).

### 2.2.3 Life Stress

The Difficult Life Circumstances Scale (DLC; Barnard et al., 1994) is a measure designed to assess problems faced by women with children who are living in low-resourced environments with good construct and convergent validity (Curry et al., 1994; Ilyumzhinova et al., 2021). The scale was administered at T0 and T1 to assess stressful life events. The DLC is a 28-item checklist of stressful experiences encompassing problems with romantic partners, finances, housing, health, crime, and abuse. Each item is answered 0 = no and 1 = yes and is used to create a total score ranging from 0 to 28 ($\alpha$ = 0.649 at T0 and 0.591 at T1).

### 2.2.4 Perceived Discrimination or Unfair Treatment

The Everyday Discrimination Scale (EDS; Williams, Yu, Jackson, & Anderson, 1997) was completed at T0 and T1. The EDS comprises 9-items that assess perceptions of discrimination or unfair treatment. The questions posed by this measure are open-ended to allow individuals to report on any perceptions of unfair treatment regardless of the perceived reason (e.g., race, gender, body size). Items (e.g., "How often were you treated with less respect than other people?") are scored on 4-point Likert scales (ranging from 0 = never to 4 = often) and summed to form a total score ($\alpha$ = 0.855 at T0 and 0.874 at T1). Within other studies, the EDS has shown good reliability and validity (Clark et al., 2004).

### 2.2.5 Covariates

At time T0, participants reported on employment, cohabitation status, and whether they received public assistance (e.g., The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)). Severity of depressive symptoms at T0 were assessed using the Adult Self-Report Inventory-4 (ASRI-4; (Gadow et al., 2004), a scale with high convergent and discriminant validity (Gadow et al., 2004). The 11 items on this sub-scale included 9 DSM-IV symptoms plus two additional related symptoms: low self-esteem and hopelessness. Each item was assessed on a 4-point scale (0 = never, 3 = all the time). At T2, participants reported on parity (0 = nulliparous, 1 = parous), and date of their child's birth, which was used to determine weeks postpartum and to estimate the participant's age at conception as well as gestational age at T1, based on a 40 week pregnancy.

## 2.3 Data Analytic Plan

Prior to analyses, data were screened for outliers, which were handled using the winsorization method to reduce bias (Kwak & Kim, 2017). We then examined bivariate correlations between eight potential covariates and satisfaction with life, flourishing, and race. Covariates comprised employment status, receipt of public assistance, cohabitation, and depression severity each assessed at T0, as well as maternal age at conception, parity, gestational age at T1, and weeks postpartum at T2. Variables that were statistically associated with satisfaction with life, flourishing, and/or race were retained in final models.

Repeated measure MANOVAs were computed to examine the effect of race and time on life satisfaction and flourishing. To test the hypothesis that changes in life stress and

discrimination from preconception to pregnancy mediated the association between race and changes in life satisfaction/flourishing across the peripartum period, the PROCESS macro for SPSS (Preacher & Hayes, 2008) was used to assess two multiple mediation models using bootstrapping with 5,000 resamples. Race was entered as the independent variable, and T1 life stress and perceived discrimination/unfair treatment were simultaneously entered as mediators with T0 life stress and discrimination as additional covariates. We examined four dependent variables (i.e., total of four mediation models): (1) change in life satisfaction from preconception to pregnancy (T1-T0) (2) changes in life satisfaction from pregnancy to postpartum (T2-T1) (3) changes in flourishing from preconception to pregnancy (T1-T0) and (4) changes in flourishing from pregnancy to postpartum (T2-T1).

## 3 Results

Descriptive statistics are shown in Table 1. Participants had a mean age of 22 years at time of conception (SD = 1.68, range = 18–26). On average, the T1 assessment was completed at 21.71 weeks' gestation (SD = 8.89, range = 6–39) and the T2 assessment was completed at 7.46 months (32.41 weeks) postpartum (SD = 11.15, range = 3–58). More than half of the sample (58%) were nulliparous at T0 and 13% reported living with a spouse or domestic partner. Approximately 71% were employed and 23% were receiving public assistance.

Bivariate correlations are shown in Table 2. Severity of depression symptoms, living with a partner, maternal age at conception, primiparity, and gestational age at T1 were all

**Table 1** Descriptive Statistics

| | N (%) | Mean | SD | Range |
|---|---|---|---|---|
| Race (1 = Black, 0 = White) | 131 (76%) | 0.76 | 0.43 | 0–1 |
| Age at conception | – | 22.12 | 1.68 | 18–26 |
| Gestational age at T1 (weeks) | – | 21.71 | 8.89 | 6–39 |
| Postpartum weeks at T2 | – | 32.41 | 11.15 | 3–58 |
| Primiparity at T0 | 100 (58%) | 0.58 | 0.50 | 0–1 |
| Employment status at T0 | 122 (71%) | 0.71 | 0.46 | 0–1 |
| Public Assistance at T0 | 39 (23%) | 0.23 | 0.42 | 0–1 |
| Cohabitation at T0 | 23 (13%) | 0.13 | 0.34 | 0–1 |
| Depression severity at T0 | – | 7.19 | 4.94 | 0–24 |
| Life stress at T0 | – | 2.34 | 2.33 | 0–11 |
| Life stress at T1 | | 2.20 | 2.08 | 0–10 |
| Everyday Discrimination at T0 | – | 15.09 | 5.06 | 9–34 |
| Everyday Discrimination at T1 | | 14.98 | 5.08 | 9–32 |
| Life Satisfaction at T0 | – | 25.45 | 6.33 | 5–35 |
| Life Satisfaction at T1 | – | 26.93 | 5.59 | 10–35 |
| Life Satisfaction at T2 | – | 26.21 | 6.01 | 7–35 |
| Flourishing at T0 | – | 47.56 | 5.32 | 30–56 |
| Flourishing at T1 | – | 48.22 | 5.47 | 26–56 |
| Flourishing at T2 | – | 48.21 | 5.99 | 30–56 |

*T0* preconception, *T1* during pregnancy, *T2* post-pregnancy

**Table 2** Bivariate correlations

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Race (1 = Black, 0 = White) | | | | | | | | | | | | | | | | | | |
| 2. Age at conception | .14 | | | | | | | | | | | | | | | | | |
| 3. Gestational age_T1 | −.03 | −.07 | | | | | | | | | | | | | | | | |
| 4. Postpartum weeks_T2 | .04 | −.13 | .44** | | | | | | | | | | | | | | | |
| 5. Primiparity | −.16* | −.26** | .15* | 0.08 | | | | | | | | | | | | | | |
| 6. Employment status_T0 | −.04 | .18* | .18* | 0.06 | .17* | | | | | | | | | | | | | |
| 7. Public Assistance_T0 | .11 | .09 | −.20** | −0.12 | −.63** | −.20** | | | | | | | | | | | | |
| 8. Cohabitation_T0 | −.22** | .03 | .00 | −.03 | −.15 | −.08 | .16* | | | | | | | | | | | |
| 9. Depression severity_T0 | −.07 | −.02 | .07 | .00 | .02 | −.08 | −.04 | .09 | | | | | | | | | | |
| 10. Life stress_T0 | −.11 | .09 | .03 | .04 | −.06 | −.03 | .02 | .06 | .48** | | | | | | | | | |
| 11. Life stress_T1 | .08 | −.01 | .05 | .08 | −.13 | .04 | .04 | .09 | .32** | .43** | | | | | | | | |
| 12. Everyday Discrimination_T0 | −.23** | -.02 | .02 | −.01 | −.12 | −.04 | −.01 | .13 | .49** | .46** | .21** | | | | | | | |
| 13. Everyday Discrimination_T1 | −.12 | −.09 | −.05 | −.03 | −.08 | −.04 | −.00 | .18* | .41** | .27** | .18* | .62** | | | | | | |
| 14. Life Satisfaction_T0 | .08 | −.01 | −.11 | .07 | .01 | .05 | .03 | .05 | −.49** | −.36** | −.21** | −.33** | −.24** | | | | | |
| 15. Life Satisfaction_T1 | −.12 | .07 | −.15* | −.09 | −.06 | −.02 | .09 | −.01 | −.32** | −.26** | −.28** | −.23** | −.25** | .52** | | | | |
| 16. Life Satisfaction_T2 | −.23** | −.10 | −.26** | −.08 | .06 | .07 | .04 | .01 | −.17* | −.22** | −.29** | −.17* | −.13 | .38** | .44** | | | |
| 17. Flourishing_T0 | −.02 | .17* | −.07 | −.04 | .02 | .07 | −.04 | .02 | −.29** | −.17* | −.08 | −.28** | −.36** | .47** | .38** | .18* | | |
| 18. Flourishing_T1 | .14 | .08 | −.07 | −.04 | .03 | −.01 | .04 | −.14 | −.25** | −.27** | −.17* | −.23** | −.25** | .39** | .51** | .19* | .53** | |
| 19. Flourishing_T2 | −.09 | −.02 | −.31** | −0.10 | .02 | −.08 | −.07 | −.03 | −.28** | −.20** | −.22** | −.19* | −.12 | .33** | .43** | .49** | .47** | .44** |

*$p < .05$, **$p < .01$, *T0* preconception, *T1* during pregnancy, *T2* postpartum

related to life satisfaction, flourishing, and/or race and thus were included as covariates in subsequent models.

### 3.1 Change in Well-Being Across the Peripartum Period

Overall MANOVA results showed a significant main effect of time ($\Lambda = .965$, $F(4, 662) = 3.02$, $p = 0.02$, $\eta_p^2 = 0.018$) and a significant interaction of time x race ($\Lambda = 0.921$, $F(4, 662) = 6.97$, $p < 0.001$, $\eta_p^2 = 0.04$) after controlling for covariates.

As shown in Table 3, after adjusting for covariates, there was no significant effect of race or time on life satisfaction. However, a significant interaction of race x time on life satisfaction was revealed. Post-hoc analyses suggest that life satisfaction significantly increased from T0 to T1, remaining elevated from T1 to T2 for White women but not Black women (Fig. 1).

Also in Table 3, after controlling for covariates, there was a main effect of time flourishing. Flourishing levels did not vary by race but there was a significant interaction of race x time on flourishing (Fig. 2). Examining year-to-year changes for Black and White women separately revealed an increase in flourishing from T0 to T1 for Black but not White women and an increase in flourishing from T1 to T2 for White but not for Black women (Fig. 2).

### 3.2 Multiple Mediation Models for Psychological Well-Being

#### 3.2.1 Life Satisfaction: Preconception (T0) to Pregnancy (T1)

As shown in Fig. 3, the total effect of race on change in life satisfaction from preconception (T0) to pregnancy (T1) was significant, such that White women reported greater increases in life satisfaction than Black women after adjusting for covariates. After adjusting for life stress at T0, race was not associated with T1 life stress nor perceived discrimination/unfair treatment. Further, the proposed mediators were not associated with changes in life satisfaction. There were no significant indirect effects of race on changes in life satisfaction from T0 to T1 via life stress ($B = -0.23$, $SE = 0.19$, 95% CI [− 0.69, 0.02]) or perceived discrimination/unfair treatment ($B = -0.07$, $SE = 0.14$, 95% CI [− 0.42, 0.16]).

**Table 3** The Effects of Time and Race on Life Satisfaction and Flourishing

| Well-Being Type | Test | Predictor | df | Type III SS | MS | F | *P* value | $\eta_p^2$ |
|---|---|---|---|---|---|---|---|---|
| Life Satisfaction | Univariate Tests | Time | 2 | 45.627 | 22.814 | 1.276 | .280 | 0.008 |
| | | Time x Race | 2 | 319.314 | 159.657 | 8.932 | .000 | .051 |
| | | Error | 332 | 5934.383 | 17.875 | – | – | – |
| | Between-Subjects Effects | Race | 1 | 178.914 | 178.914 | 3.329 | 0.70 | 0.020 |
| | | Error | 166 | 8922.449 | 52.750 | – | – | – |
| Flourishing | Univariate Tests | Time | 2 | 161.261 | 80.630 | 5.268 | 0.006 | 0.031 |
| | | Time x Race | 2 | 122.867 | 61.434 | 4.014 | .019 | 0.024 |
| | | Error | 332 | 5081.316 | 15.305 | – | – | – |
| | Between-Subjects Effects | Race | 1 | 6.774 | 6.774 | 0.126 | 0.723 | 0.001 |
| | | Error | 166 | 8910.446 | 53.680 | – | – | – |

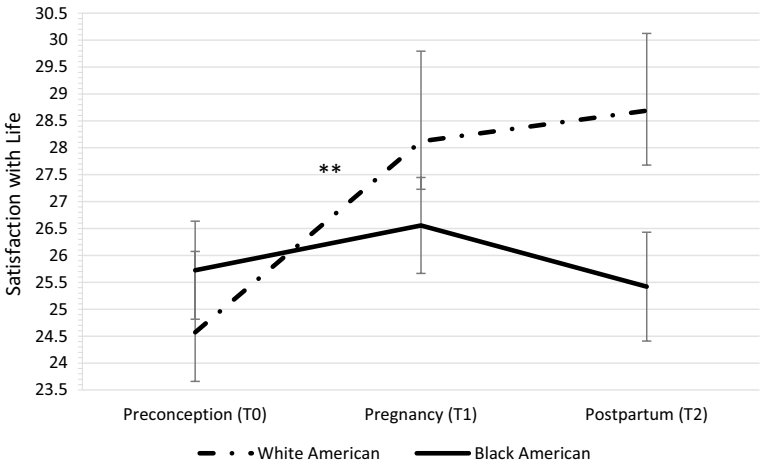


**Fig. 1** Race moderated the change in life satisfaction over the perinatal period. Significant change between time points is indicated by $*p < .05$ and $**p < .01$. Standard error bars are SE*1.96

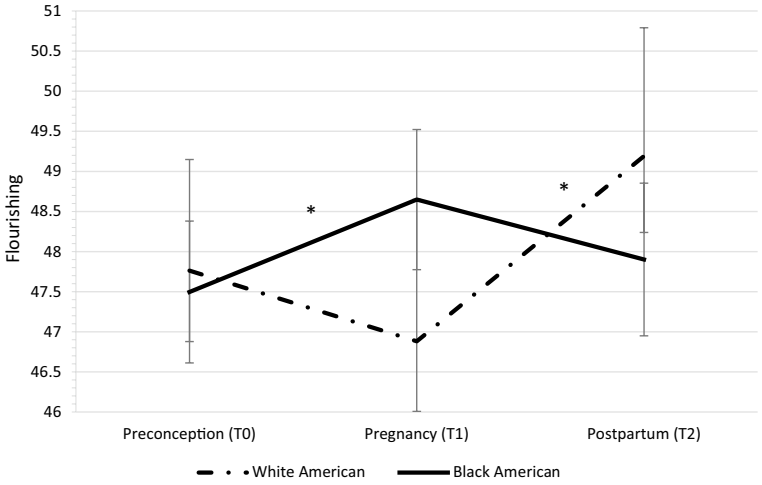


**Fig. 2** Race moderated the change in flourishing over the perinatal period. Significant change between time points is indicated by $*p < .05$ and $**p < .01$. Standard error bars are SE*1.96

### 3.2.2 Life Satisfaction: Pregnancy (T1) to Postpartum (T2)

Figure 3 shows that the effect of race on change in life satisfaction from T1 to T2 was not significant after controlling for covariates. Race did not predict changes in life stress nor perceived discrimination/ unfair treatment from T0 to T1 nor did the proposed mediators predict changes in life satisfaction from T1 to T2. The indirect effect of race on changes in life satisfaction from T1 to T2 through life stress ($B = -0.10$, $SE = 0.18$, 95% CI [− 0.50, 0.23]) and perceived discrimination/unfair treatment ($B = 0.05$, $SE = 0.13$, 95% CI [− 0.18, 0.37]) were nonsignificant.

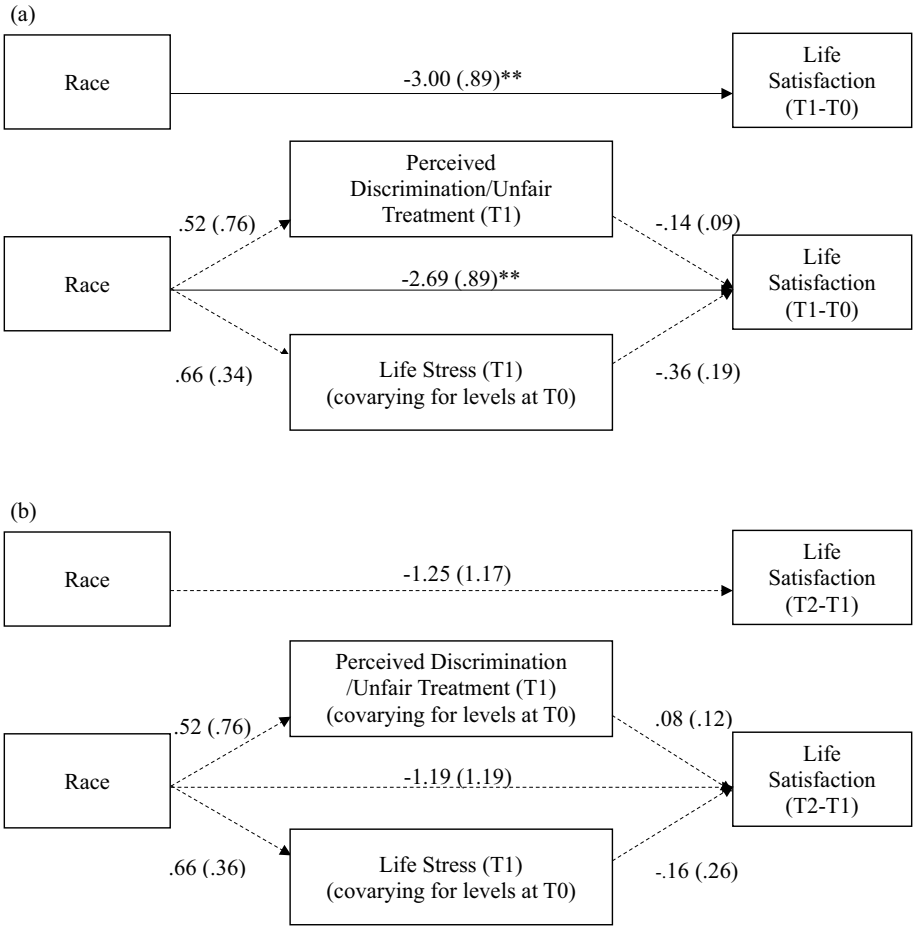


**Fig. 3** Multiple mediation model from race to life satisfaction change from preconception to pregnancy (Panel 1) and pregnancy to postpartum (Panel b) through pregnancy life stress and everyday discrimination, controlling for preconception life stress and everyday discrimination, and all covariates. T0 = preconception, T1 = pregnancy, T2 = postpartum. Race = 1 for Black American mothers and = 0 for White American mothers. *Significant at $p < .05$, **Significant at $p < .01$

### 3.2.3 Flourishing: Preconception (T0) to Pregnancy (T1)

As shown in Fig. 4, the total effect of race on flourishing was not significant from T0 to T1 after adjusting for covariates. Race was not associated with T1 life stress nor perceived discrimination/unfair treatment after accounting for T0 levels. Neither life stress nor perceived discrimination/unfair treatment were associated with flourishing from T0 to T1. None of the indirect effects through life stress ($B = -0.14$, $SE = 0.15$, 95% CI [− 0.49, 0.12]) or discrimination/unfair treatment ($B = 0.00$, $SE = 0.07$, 95% CI [− 0.11, 0.19]) were significant when predicting changes in flourishing from T0 to T1.

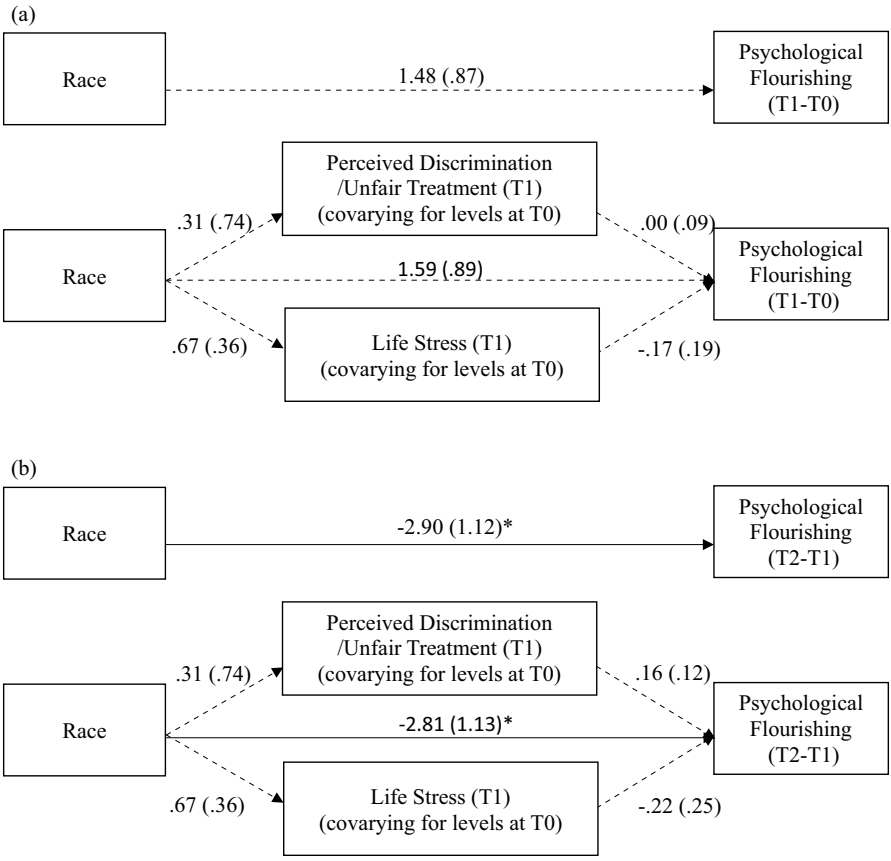


**Fig. 4** Multiple mediation model from race to flourishing change from preconception to pregnancy (Panel 1) and pregnancy to postpartum (Panel b) pregnancy life stress and everyday discrimination, controlling for preconception life stress and everyday discrimination, and all covariates. T0 = preconception, T1 = pregnancy, T2 = postpartum. Race = 1 for Black American mothers and = 0 for White American mothers. *Significant at $p < .05$, **Significant at $p < .01$

### 3.2.4 Flourishing: Pregnancy (T1) to Postpartum (T2)

Figure 4 shows that when predicting changes in flourishing from T1 to T2, the total effect of race was significant after controlling for covariates: Black mothers showed less increase in flourishing from T1 to T2. However, race was not associated with life stress nor perceived discrimination/unfair treatment after controlling for all covariates. None of the proposed mediators were associated with changes in flourishing from T1 to T2. The indirect effect of race on changes in flourishing from T1 to T2 through life stress ($B = -0.17$, $SE = 0.21$, 95% CI [− 0.69, 0.17]) and perceived discrimination/unfair treatment ($B = 0.04$, $SE = 0.16$, 95% CI [− 0.28, 0.38]) were nonsignificant.

## 4 Discussion

The primary aims of this study were to investigate changes in psychological well-being (i.e., life satisfaction and flourishing) across the perinatal period and to consider how these changes in well-being differed between young (mean age = 22 years) Black and White American women. The main strengths of our study included the ability to leverage unique data collected from a longitudinal study that began prior to the target pregnancy. The current study used a within-person analytic approach to examine changes spanning the period from preconception through postpartum to fully capture the transition to parenthood. In addition, the study extended prior research with the goal of increasing generalizability of findings by utilizing data from a racially and economically diverse community sample of young Black and White American women.

Overall, our findings highlight the importance of considering the socio-demographic characteristics of women included in perinatal research studies, given that patterns of change in psychological well-being across the perinatal period were moderated by race. Several key findings emerged: 1) Satisfaction with life increased over the perinatal period for White but not Black American women. 2) Flourishing levels showed different patterns of change, increasing from preconception to pregnancy for Black American women and from pregnancy to postpartum for White American women. However, no change in flourishing was observed from preconception to postpartum for Black or White women. 3) None of these changes were explained by our proposed mediators: life stress nor discrimination/unfair treatment. Below, we discuss each of these findings in the context of prior research and highlight directions for future research.

Most participants in this study reported a 'high' score on the Satisfaction with Life Scale throughout the entirety of the perinatal period, which is consistent with a review study showing that people generally report high levels of life satisfaction during pregnancy (Battulga et al., 2021; Diener, n.d.). Thus, despite being a younger sample with relatively higher socioeconomic strain, most of the young pregnant women in our study generally felt that things were going well in their lives, and that life was enjoyable (Diener et al., 1985).

Black and White American women differed in their patterns of life satisfaction across the perinatal period. White women in our study reported an increase in life satisfaction from preconception to pregnancy; this elevation in life satisfaction remained stable from pregnancy to postpartum. The increase reported by White women in our study over the perinatal period is consistent with findings from prior studies conducted in European countries. In contrast, Black American women reported stable life satisfaction levels across all timepoints, which is consistent with a prior cross-sectional study that showed a positive association between pregnancy and life satisfaction for White but not Black American women (Hagstrom & Wu, 2016). Our findings suggest that these racial disparities in life satisfaction during pregnancy are specifically driven by differences in how life satisfaction *changes* from preconception to pregnancy for Black vs. White American women, differences that then persist into the postpartum period.

Further, while past work drawn primarily from pregnant women in their late 20s–30s has shown an increase in life satisfaction from pregnancy to postpartum periods, our study showed stable levels from pregnancy to postpartum for both White and Black American women. Hence, it may be helpful for future studies to investigate why some women may see an increase in life satisfaction from pregnancy to postpartum, while others do not. One potential explanatory factor could be that our sample is comprised of younger women, who may face additional challenges after birth that may impact their

levels of life satisfaction during the postpartum period, including increased experiences of postpartum depression symptoms (Estrin et al., 2019; Kingston et al., 2012). Additionally, much of prior work has been with European samples, thus policy differences between European countries and the U.S. (e.g., parental leave, health insurance, etc.) may also explain this differential finding.

Of note, although there were significant race differences in the pattern of life satisfaction change, overall levels of life satisfaction remained in the "high" category for both Black and White American women. These findings suggest that while Black women may not experience a significant increase in satisfaction across the perinatal period, they continue to report overall high levels of life satisfaction. Although we observed no group differences in preconception or prenatal levels, future work could consider person-centered analytic approaches, as this may reveal that those with a lower life satisfaction at preconception show greater increases by virtue of having more room for improvement, and therefore a greater likelihood of growth in satisfaction from preconception to pregnancy.

Further, our results highlight the importance of considering different aspects of well-being given that, compared to life satisfaction, levels of flourishing followed a different pattern of change across the perinatal period. Again, for White American women, self-reported levels of flourishing remained stable from preconception to pregnancy; flourishing levels then increased from pregnancy to postpartum. In contrast, for Black American women, flourishing levels increased from preconception to pregnancy but did not significantly change from pregnancy to postpartum. Notably, postpartum levels of flourishing did not differ significantly from preconception levels for White or Black American women. Further, although the increase in flourishing from pregnancy to postpartum among White American women has been reported in prior work (Bassi et al., 2017), no studies to our knowledge have contextualized these findings relative to preconception levels or probed race differences in a U.S. sample. Our study suggests that although White American mothers may report increases in flourishing from pregnancy to postpartum, levels of flourishing in the postpartum period do not appear to be significantly higher than preconception levels. In addition, our results indicate that while overall levels of flourishing across the perinatal period did not differ between Black and White American women, the developmental pattern did vary by race. Given this, future research should explore potential mechanisms that may account for the race differences in patterns of life satisfaction and flourishing changes across the perinatal period.

Our third hypothesis stated that life stress and discrimination/unfair treatment would act as explanatory factors for the relationship between race and perinatal well-being change. We found that changes in discrimination/unfair treatment did not mediate the relationship between race and changes in perinatal well-being. In addition, race did not predict changes in perceived discrimination/unfair treatment across the perinatal period. These findings may have been influenced by how the specific measure of discrimination was used in this study. Indeed, a few recent studies have highlighted potential limitations of the Everyday Discrimination Scale for group comparisons due to the way that items are worded (Harnois et al., 2019). In addition, when our study implemented this measure, the measure asked questions about perceived mistreatment in a broad context, without specifying discriminating behaviour or considering attribution of the mistreatment (i.e., race, gender, age, etc.). Hence, these results may limit the ability to compare discrimination experiences between White and Black American women. Further, past work suggests there are many predictors of perceived discrimination levels that are relevant for our sample of young mothers. Some predictors of discrimination include cohabitation status, lifetime number of lifetime sexual partners, and birth control use (Hall et al., 2015). While we were able to control for

multiple socio-demographic and health variables (i.e., receipt of public assistance, employment, age at conception, parity, and cohabitation status), other unmeasured factors may have influenced levels of perceived discrimination in this study. In addition, a proportion of the included participants were over-sampled from lower-resourced neighbourhoods, and past work shows that unfair treatment is differently associated with socioeconomic status (SES) for Black vs. White Americans. Specifically, evidence suggests that SES is negatively associated with discrimination for White Americans, but positively associated with discrimination for Black Americans (Hudson et al., 2012; Lewis et al., 2015). The lack of variability in income levels for the Black women in our sample may have impacted the range of discrimination experiences.

Several additional study limitations are important to mention. First, because data were drawn from a longitudinal study that administered annual assessments, the timing of the prenatal and postpartum assessments varied substantially. Although we covaried for the time at which T1 and T2 measures were assessed (i.e., weeks gestation and postpartum), future studies with multiple assessments within each life stage are needed to examine the extent to which well-being changes over the course of pregnancy (i.e., from one trimester to the next) or over the course of the first year postpartum. Second, while this study elucidated differences in well-being between young, Black and White American women over the perinatal period, the sample comprised young mothers who identified as one of these two races and who were mostly single and from lower-resourced neighbourhoods. Thus, future work should consider how well-being changes over the perinatal period among a broader sample of reproductive aged women, representing other race/ethnicities and the continuum of SES. Third, some of the proposed mediators were measured at the same time as some of the outcome variables (T0 to T1), precluding interpretations about the directionality of effects. Finally, our sample size was relatively modest ($n = 173$), with unequal samples between White ($n = 42$) and Black ($n = 131$) participants; future work would benefit from a larger sample with more equal distributions among racial groups to increase statistical power.

Altogether, our findings point to a need for further research as well as several potential policy and clinical implications. Given that maternal psychological well-being has been linked to the health of both the mother and the child (Blake et al., 2007; Orr et al., 2012), and that Black American women experience significant health-related disparities in both prenatal health (Gold et al., 2014) and birth outcomes (Schaaf et al., 2013), it may be important to target the causes of psychological well-being disparities, specifically within life satisfaction. Our findings suggest that, on average, young Black American women may not experience the same increase in life satisfaction that White American women report over the perinatal period. However neither our measure for life stress nor unfair treatment explained these disparities. Hence, additional work to elucidate the causes of the racial differences in life satisfaction change is clearly warranted. Given the limitations of our discrimination scale, and the well documented effects of racial discrimination for Black women in the U.S., the disparities within psychological well-being documented in our paper suggest the need to further explore the relationship between gendered racism and changes in psychological well-being from preconception to postpartum (Forson-Dare et al., 2021; Giscombé & Lobel, 2005; Mehra et al., 2020; Rosenthal & Lobel, 2011). In addition to this, future work should also consider other factors that could bolster changes in life satisfaction for Black American women. One such factor may be social support; a review study found that social support is positively related to life satisfaction during pregnancy (Battulga et al., 2021) and a close mother-daughter relationship during pregnancy can help

to support positive emotions linked to well-being during pregnancy among young Black pregnant women (Tung et al., 2021).

Clinically, our results suggest it may also be helpful to screen for low life satisfaction levels during pregnancy. While many of the mothers in this study did report high levels of life satisfaction, for mothers who report low life satisfaction levels, emerging evidence suggests positive psychology interventions, conducted in-person by midwifes or online, is effective in improving well-being during the perinatal period (Corno et al., 2018; Zhang & Emory, 2015). Further, recent research shows that when women are provided additional support before and after birth by a doula, measures related to psychological well-being (i.e., self-esteem, self-efficacy, social support) increase (McLeish & Redshaw, 2019). Given the potential positive effects of both positive intervention therapy as well as doula support, our current analyses suggest a need for greater access to therapy and doulas during the perinatal period as a means of increasing support for young Black American mothers during and after pregnancy.

## 5 Conclusions

Our study investigated changes in psychological well-being (life satisfaction and flourishing) over the perinatal period among a sample of young Black and White American women. The perinatal period appeared to have a positive effect on satisfaction with life levels for White but not Black American women. In contrast, flourishing showed slightly different pattern of change for Black and White women. Given that women who are very satisfied with their life are at a lower risk for pre-term birth (Orr et al., 2012), additional effort is needed to promote levels of life satisfaction during the perinatal period for young Black American women with the ultimate goal of reducing racial disparities in perinatal health.

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